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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,104	03/21/2002	Charles Adrian Becker	RD-29430	3459
6147	7590	11/10/2005	EXAMINER	
GENERAL ELECTRIC COMPANY GLOBAL RESEARCH PATENT DOCKET RM. BLDG. K1-4A59 NISKAYUNA, NY 12309			PATEL, ISHWARBHAI B	
			ART UNIT	PAPER NUMBER
			2841	

DATE MAILED: 11/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/063,104

Applicant(s)

BECKER ET AL.

Examiner

Ishwar (I. B.) Patel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-59 is/are pending in the application.
- 4a) Of the above claim(s) 14-59 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

RCE

1. This action is in response to a request for continued examination (RCE) filed on September 29, 2005.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the dielectric protective layer disposed to cover said electrical circuit component and circuit traces, as claimed in claim 5, and said at least a heat sink covers a plurality of said removed portions, as claimed in claim 12, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. (The elected specie of figure 5 and 6 does not show any protective layer. Also, the figures show one heat sink covering one of the removed portions).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

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changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 12 objected to because of the following:

Regarding claim 1: The phrase "each of said plurality heat sinks", line 7, should be "each of said plurality **of** heat sinks". It appears to be typographical mistake.

Regarding claim 6: "said at least **a heat sink**", lacks proper antecedent basis.

Claim 7 depends upon claim 6 and inherits the same deficiency.

Regarding claim 8: "said at least **a heat sink**", lacks proper antecedent basis.

Regarding claims 9-10: "said **heat sink**", lacks proper antecedent basis. Claim 11 depends upon claim 10 and inherits the same deficiency.

Regarding claim 12: "said at least **a heat sink**", lacks proper antecedent basis.

Further, the recitation "said at least a heat sink covers a plurality of said removed portions" contradicts the recitation "**each** of said plurality of heat sinks covering

corresponding **one** of a plurality of removed portions", of claim 1. Claim 12 directly depends upon claim 1.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1-7 and 13 are rejected under 35 U.S.C. 102(a) as being anticipated by Harrah, US Patent No. 6,936,855.

Regarding claim 1, Harrah, in figure 5, discloses a flexible interconnect structure comprising:

a flexible dielectric film (41X) having two opposed surfaces, at least a portion of said dielectric film being removed through a thickness thereof forming a plurality of removed portions (removed portions formed by vias 41Y, 41Z, 41AA, 41AB etc, column 19, line 53-54); circuit traces (41B, 41C, 41D, 41E, 41F, 41G, 41H, 41J etc, column 19, line 47-49) disposed on at least one of said opposing surfaces, and a plurality of heat sinks (60, 61, 62, 63 etc, column 19, line 56-58) coupled to a surface of said dielectric film, each of said plurality of heat sink covering corresponding one of a plurality of removed portions and less than one of said opposing surface of said flexible dielectric film (see figure 5), such that the interconnect structure remains flexible (column 19, line 40-46).

Regarding claim 2, Harrah further discloses said dielectric film made of polyimide (column 20, line 19-20).

Regarding claim 3, Harrah further discloses said dielectric film has a thickness of about 0.004 inch to 0.010 inch (0.1 to .25 mm), which is within the range from about 1 micrometer to about 5 mm, (column 20, line 21-22).

Regarding claim 4, Harrah further discloses an integrated circuit (LED die, column 5, line 45-47) or resistor or power supply (column 25, line 60 to column 26, line 10), as an electrical circuit component.

Regarding claim 5, Harrah further discloses a dielectric protective layer (dielectric material 70, 71, shown in more detail in figure 1) disposed to cover said electrical circuit component and circuit traces.

Regarding claim 6 and 7, Harrah further discloses said at least a heat sink comprises a thermally conductive material selected from metal (metal heat spreader, column 19, line 58-59).

Regarding claim 13, Harrah further discloses said at least heat sink comprises a body made of a material selected from the group consisting of metals (metal heat spreader, column 19, line 58-59).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah, as applied to claim 1 above, and further in view of Azar, US Patent No. 5,920,458.

Regarding claim 8, Harrah discloses all the features of the claimed invention including the heat sink, as applied to claim 1 above, but does not disclose the least heat sink has fins extending away from said dielectric film.

Azar, in embodiment shown in figure 4, discloses a printed circuit board assembly with an enhance cooling of a heat dissipating circuit element, with a heat sink having fins (32, figure 4) for enhancing the heat dissipation.

A person of ordinary skill at the time of applicant's claims invention would have recognized the advantage of providing fins to the heat sink in order to enhance the heat dissipation rate.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the heat sink of Harrah with fins, as taught by Azar, in order to enhance the heat dissipation rate.

Regarding claim 9-11, the applicant is further claiming said heat sink comprise heat pipes to carry heat away from an electrical component disposed thereon, as claimed in claim 9, said heat sink comprises a mechanism for active cooling, as claimed in claim 10 and said active cooling is effected by a mechanism selected from forced cooling or refrigeration, as claimed in claim 11.

Harrah does not disclose such limitations.

Azar, in another embodiment (figure 5), further discloses the heat dissipation member comprises a hollow core heat exchanger 36. A flow controller 38, which may be refrigerator-type device, in fluid communication with a through bore 39 of the heat exchanger 36. Either liquid or air can be utilized as a coolant and the flow controller 38 effects the passage of such coolant through the through bore 39 of the heat exchanger 36, column 3, line 35-43, for further enhancing the heat dissipation rate.

A person of ordinary skill at the time of applicant's claims invention would have recognized the advantage of providing such elements to enhance the heat dissipation rate.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the assembly of Harrah with said heat sink comprising heat pipes to carry heat away from an electrical component disposed

thereon, as claimed in claim 9, said heat sink comprising a mechanism for active cooling, as claimed in claim 10 and said active cooling is effected by a mechanism selected from forced cooling or refrigeration, as claimed in claim 11, as taught by Azar, in order to in order to enhance the heat dissipation rate.

8. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Harrah, as applied to claim 1 above, and further in view of Yen, US Patent No. 6,612,717.

Regarding claim 12, Harrah further discloses all the features of the claimed invention as applied to claim 1 above including the heat sink, but does not disclose the heat sink covers a plurality of said removed portions.

Yen, in figure 4, disclose a lamp assembly with a set of three LED (311) installed on a soft circuit board (305) and each set of three LEDs are covered by single heat sink (313). This implies that the heat sink is covering respective three holes for the installation of three LED.

A person of ordinal skill in the art at the time of applicant's invention would have been motivated to use a single heat sink for multiple removed portion in order to reduce the number of heat sink to lower the cost.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the assembly of Harrah with the heat sink covering a plurality of said removed portions, as taught by Yen, in order to reduce the cost of the device.

Response to Arguments

9. Applicant's arguments with respect to claims 1-13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Kurokawa, US Patent No. 5,291,064, in figure 6, discloses a heat sink with water jacket.

Hochstein, US Patent No. 6,517,218, in figure 1 and 2, discloses an electrically driven light emitting diode assembly with a heat sink.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ishwar (I. B.) Patel
Examiner
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November 8, 2005